

COMPARATIVE STUDY OF SOME SEMI-DRY ARABIAN DATE PALM CULTIVARS GROWN IN MOUNOFIA GOVERNORATE

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Abstract

This study was carried out through 2014 and 2015 to study the performance of four Arabian semi-dry date cultivars produced through tissue culture namely: "Zahdi", "Sakai", "Medjool", and "Khalas" grown in El-Khatatba region, Mounofia governorate, Egypt in comparison with the commercial semi-dry cv. "Sewy" (as a local cultivar). The study involved the flowed assessed parameters, dates of the first and last spathe emergence and bursting, fruit set and fruit retention %, date of harvest, number of bunches/palm and average yield per palm, as well as physical and chemical properties of fruits. Emergence and bursting of spathe of "Medjool" and "Khalas" occurred early, followed by "Sewy" and "Zahdi" while "Sakai" cv. came last. Harvesting of all tested cultivars was done on the first week of October. Regarding the yield, highest yield was obtained from "Madjool" palms in comparison with other tested cvs. followed by "Sewy" and "Zahdi" while it was the lowest with "Sakai" and "Khalas". Also, "Sewy" and "Madjool" palms produced the highest number of bunches /palm while the lowest number of bunches /palm was recorded by "Sakai". With regard to fruit set and fruit retention % "Medjool" cv. attained the highest percentage of fruit set and fruit retention% while "Khalas" was the lowest cultivar in this respect. Concerning physical properties, data proved the superiority of "Medjool" fruits in weight, dimensions and flesh/fruit weight% meanwhile "Sakai" fruits were the opposite. As for chemical properties, moisture content in fruits was the highest in "Sakai" fruits and lowest in "Khalas". Data proved the superiority of "Sakai" and "Madjool" in T.S.S% and total sugars content. Results showed also that most of these sugars were reducing sugars. Regarding tannins content, the differences between tested cultivars did not reach the level of significance. General evaluation revealed that "Madjool" cv. proved to be the superior cv. in yield and fruit quality among all the studied cvs., followed by "Sewy" cultivar which ranked the second in both total score units of yield and fruit quality, while "Khalas" and "Sakai" cvs. had the lowest score in general evaluation due to receiving the lowest score units specified for yield. However, fruit quality of these cvs. was lower than of the standard cultivar ("Sewy"). In addition, "Zahdi" cv. seemed to be of great yield but fruit quality was less than that of "Sewy" cv. Thus, one can conclude that "Medjool" and

"Sewy" cvs. proved to be the superior cvs. in yield and fruit quality. However "Zahdi" cv. seemed to be of great yield but fruit quality was lower than the standard cv. "Sewy". On the other hand, "Sakai" cv. showed lower palm yield but fruit quality was reasonable for consumer, but, it was generally lower than of "Sewy" cultivar.

Key words: Semi-dry date palm -Numerical evaluation

INTRODUCTION

Date palm grows successfully throughout Egypt from the relatively cool coast of Mediterranean sea (lat. 31°.30' N) up to the burning heat of Asswan governorate (lat. 22°N). Cultivars naturally confine themselves to certain localities where they do better elsewhere. For instance, on the Mediterranean shore we find soft dates cultivars, at middle Egypt the semi dry dates cultivars predominate, while Siwa, Baharia, Farafra, Dakhla and kharga Oasis are occupied mostly with "Sewy": (semi dry dates), Asswan is devoted to the dry cultivars (Brown and Bahgat, 1938). The prospective date grower should give careful attention to the selection of cultivars likely to succeed in his locality; climatic adaptations are of primary importance (Nixon, 1978). In Egypt there are only three cultivars that belong to semi dry dates group ("Sewy", "Amry" and "Aglany"). Semi dry dates cultivars are considered very important to date industry in recent years. The decrement of superior cultivars number from this group is a big problem. Recently the Ministry of Agriculture and date grower have imported some Arabian semi-dry date cultivars produced through tissue culture; these cultivars are grown now at different region. Several papers studied the behavior of some of these cultivars (Salem & Hamdy 1993; Ahmed *et al.*, 1996; Sayed, 1999 and Gadalla 2013) and the effect of agro climatic conditions on quality of date fruit and on their ripening time (Abdalla *et al.* 1991; Khan *et al.*, 2008 and Iqbal *et al.*, 2011). "Medjool" merits a more detailed account than some other varieties; it has become a very important variety to the date industry in recent years and its history is somewhat unusual. "Medjool" is the most desirable because of its large size, soft flesh, excellent taste, and attractive appearance. Zaid, (2002). on the other hand "Sewy" date cultivar is one of the most important cultivars of semi-dry dates group and to demanded in local and foreign markets for its good quality.

The aim of this present study was to compare the performance of four Arabian semi-dry date cultivars produced through tissue culture namely: "Zahdi", "Sakai", "Medjool", and "Khalas" in comparison with the commercial cv. "Sewy" (local cultivar), all grown in El-Khatatba region, Mounofia governorate, Egypt.

MATERIALS AND METHODS

The present study was conducted through two growing seasons 2014 and 2015 to compare of four Arabian date palm cultivars namely "Medjool", "Zahdi", "Sakai" and "khalas" as well as the local cultivars "Sewy" as a standard all grown under El-Khatatba region condition at Mounofia Governorate (latitude 30°N, longitude 31°W). Average maximum temperatures as well as relative humidity percentage for El-Khatatba region Mounofia governorate during 2014 & 2015 years are shown in the following Table.

Table 1. Maximum and minimum temperatures and relative humidity for El-Khatatba region during two experimental seasons (2014 – 2015).

Month	2014			2015		
	Temperature C°		Relative humidity	Temperature C°		Relative humidity
	Max.	Min.		Max.	Min.	
May	32	17.0	51	38.7	22.9	50
June	33.5	21.1	55	41.5	25.1	54
July	36.9	22.4	61	41.6	24.6	62
August	34.2	20.0	60	40.9	24.0	63
Sept.	33.1	16.6	59	37.8	22.9	58
Octo.	30.5	15.5	47	35.9	20.3	48

* Source Central Laboratory for Agricultural Climate (CLAC) A.R.E.

The Five tested cultivars belong to the yellow color type of semi dry date's group (Gadalla, 2013). Each cv. was represented by five palms (i.e. five replicates) and palms of all the studied cvs. were in full production stage, nearly at the same age (about 15 years old) and received the same horticultural practices and pollinated within two days after spathe bursting by using pollen grains from the same parent in both seasons. The following indices were studied and recorded:

Spathe emergence and bursting: Dates of commencement and ending of spathes emergence and bursting.

Yield and bunch characteristics: the harvest took place when the fruits reached to the first tamr stage, the following data were recorded: date of harvest, number of bunches per palm and yield per palm.

Fruit set %: number of set fruits per stalk was recorded one month after pollination; 25 attached stalks on 5 bunches per palm were used for this purpose. The percentage of fruit set was calculated using the following equation:

$$\text{Fruit set (\%)} = \frac{\text{Av. number of set fruits/stalk}}{\text{Av. number of flowers/stalk}} \times 100$$

Fruit retention %: number of retained fruits/ stalk was recorded at harvesting time; 25 stalk on 5 bunches per palm were used for this purpose the percentage of fruit retention was calculated using the following equation:

$$\text{Fruit retention (\%)} = \frac{\text{Av. number of retained fruits/stalk}}{\text{Av. number of set- fruits/stalk}} \times 100$$

Physical and chemical properties of fruits: representative fruit sample 5• fruits collected at harvesting time of each replicate (from each palm). Fruit evaluation included fruit weight and dimensions (axial and equatorial diameter), seed weight and flesh percentage. Moisture and total soluble solids (T.S.S) % content were determined according to the method described in the A.O.A.C. (1995). Total , reducing and non reducing sugars content were determined according to the method of Lane and Eynon as described in the A.O.A.C. (1995). Also; tannins content was determined by using standard curve of tannic acid and expressed as mg tannins/g. f. wt. as described by Resenabatt and Pelluso (1941).

General evaluation of the tested Arabian cultivars: the final evaluation of any tested cultivar was calculated on the basis of 100 units which were shared between palm yield (30 units) and fruit quality (70 units) (Abdalla et al, 1995 and Gadalla, 2012) the latter units were divided on the basis of 15 units for both of fruit weight, flesh %, total sugars and 10 units for T.S.S., beside 5 units for both of fruit length, fruit diameter and tannins content, as shown in table (6). Each palm that gave the best results for any characteristics took the full mark specified for this property, while each of the other tested palms took lower units equal to their quality.

Statistical analysis: five replicates (i.e. five palms) were used per cultivar, arranged in a complete randomized design and statistically analyzed to detect variation according to (Snedecor and Cochran, 1980). New least significant differences (New L.S.D. at 0.05) were used to compare between averages (Waller &Duncan, 1969).

RESULTS AND DISCUSSION

Dates of spathe emergence and bursting and harvesting:

Data in Table (2) showed enormous variations between tested date palm cultivars in dates of emergence and bursting of spathe and harvesting. In both seasons emergence of the first and last spathe occurred in-between 10/2 to 8/3 for "Medjool" cv. followed by "Khalas" (15/2 to 10/3), "Sewy" (20/2 to 12/3), and "Zahdi"(20/2 to 10/3) and at last "Sakai" cv. (5 to 25/3). Regarding spathe bursting date, data also show the same trends as observed in spathe emergence, i.e. the sequence of the spathe bursting in both seasons was as follows:" Medjool" and"Khalas" (from 25/2 to 15/3),

"Sewy" (from 5 to 25/3), "Zahdi" (from 10 to 25/3) and at last "Sakai" (from 15/3 to 5/4). In other words; the obtained data suggest that under conditions of El-Khatatba region, spathe emergence and bursting on palms of "Medjool" and "Khalas" cvs. occurred early while "Sewy" and "Zahdi" cvs. were done 5-13 days later meanwhile "Sakai" cv. was the lowest in this respect. Brown and Bahgat, (1938) stated that in lower and middle Egypt the female date palms usually commence flowering in the beginning of March. However, the same authors observed that the local date cvs. that are growing side by side under the same conditions, differences between them in spathe emergence are quite clear. Concerning harvesting date, all tested cvs. including standard cv. ("Sewy") were picked at the first week of October in both seasons. The great variations that occurred on emergence and bursting of spathe and harvesting date in most date palm cvs. was supported by the results of Salem & Hamdy (1993), Abdalla *et al.* (1995) Sayed (1999), and Gadall (2013). In addition, fruit harvesting depended upon the cultivars and weather conditions (Abou Rekab, 2005).

Table 2. Dates of spathe emergence, spathe bursting and harvesting of some Arabian and local date cultivars grown under of condition of Mounofia government during 2014 and 2015 seasons.

Cultivars	Date of spathe emergence		Date of spathebursting		Harvesting date	
	2014	2015	2014	2015	2014	2015
Zahdi	20/2 to 5/3	25/2 to 10/3	10/3 to 20/3	10/3 to 25/3	1/10	5/10
Sakai	5/3 to 15/3	15/3 to 25/3	15/3 to 1/4	25/3 to 5/4	1/10	5/10
Khalas	15/2 to 25/2	20/2 to 1/3	25/2 to 10/3	5/3 to 15/3	1/10	5/10
Medjool	10/2 to 25/2	15/2 to 8/3	25/2 to 10/3	25/2 to 15/3	1/10	5/10
Sewy	20/2 to 1/3	25/2 to 12/3	5/3 to 15/3	10/3 to 25/3	1/10	5/10

Number of bunches / palm:

Data in Table (3) show significant differences in number of bunches / palm between the tested cvs., the average of the two years show that "Sewy", "Medjool" and "Zahdi" palms produced the highest number of bunches (11.84, 11.33 and 10.84 bunches /palm, respectively with no significant differences between them, followed by "Khalas" (9.00 bunches /palm) in comparison with "Sakai" palms which produced the lowest number of bunches (6.67 bunches /palm).

Yield per palm:

From data of yield / palm presented in Table (3) reveal the same trends as that observed on number of bunches / palm, i.e. palms of "Medjool" produced the highest yield which amount to an average of 119 kgs/palm, followed by "Sewy" (about 112 kgs)

and "Zahdi" (about 110kgs), then by cultivars "Khalas" and "Sakai" which produced the least yield per palm (about 63 and 47kgs, respectively). (Increased yield/palm may be due to increased number of bunches / palm, number of retained fruits to harvest and fruit weight which ultimately affected the yield / palm positively as compared to other cultivars). These results are in harmony with those reported by Salem & Hamdy (1993), Ahmed *et al* (1996) and Sayed (1999) on some Saudi and Iraqi date palm cultivars, Gadall (2013) on some Arabian date palm cultivars including "Zahdi", "Madjool", "Khalas" and "Sakai" as well as "Sewy" as local cultivar, in addition, Abdalla *et al* (1995) on some local date cvs. who stated that there was a wide and great variation in fruiting behavior of most date palm cvs.

Fruit set and Fruit retention %:

Data in Table (3) revealed that there are a wide variation in fruit set and fruit retention % between the different Arabian date palm cultivars under El-Khatataba region conditions. The average values of the two seasons show that "Medjool" cv. attained uppermost fruit set and fruit retention percentage (84.55 and 82.12%, respectively). "Sewy" cv. came the second order (80.95 and 76.00%), in comparison with "Khalas" which showed the lowest percentage (57.33% for fruit set and 47.35% for fruit retention), while "Zahdi" and "Sakai" cvs, were in between in this respect. The obtained results are generally in line with those found by Salam & Hamdy (1993) and Gadalla (2013), who found that fruit set % of "Sewy"; "Madjool"; "Zahdi" and "Khalas" were 82.8, 82.1, 67.2, and 56.9 %, respectively.

Table 3. Yield parameters, fruit set and fruit retention % of some Arabian and local date cultivars grown under of condition of Mounofia government during 2014 and 2015 seasons.

cultivars	Number of bunches/palm			Yield / palm(kg)			Fruit set %			Fruit retention %		
	2014	2015	Av.	2014	2015	Av.	2014	2015	Av.	2014	2015	Av.
Zahdi	12.00	9.67	10.84	120.30	100.33	110.32	73.87	72.07	72.97	65.27	67.90	66.59
Sakai	7.33	6.67	6.67	43.67	50.67	47.17	77.57	76.97	77.27	71.16	71.27	71.22
Khalas	9.00	9.00	9.00	53.33	73.67	63.50	55.43	59.23	57.33	48.70	46.00	47.35
Medjool	11.33	11.33	11.33	120.67	117.67	119.17	85.07	84.03	84.55	81.33	82.90	82.12
Sewy	12.00	11.67	11.84	100.00	124.67	112.34	80.63	81.27	80.95	78.00	74.00	76.00
New L.S.D. at 0.05	1.41	1.33	1.37	7.00	5.84	6.42	1.53	1.69	1.61	1.83	1.92	1.88

Fruit physical properties:

Data in Table (4) showed that there are significant differences in fruit weight, fruit dimension and flesh weight% between the tested cvs., the average values of the two seasons show that "Madjool" fruits were superior among the tested cultivars in weight, dimensions and flesh %, meanwhile "Sakai" fruits were on the opposite. As for fruit weight, could be arranged the tested cvs. descending as follows: "Medjool"(24.20 gms as average of two seasons), "Sewy" (13.27gms), "Khalas" (11.65gms) and "Zahdi" (11.24gms) then fruits of "Sakai" cv. which were the lightest in weight (7.42 gms). Hussein *et al.* (1976) classified 18 date cvs. grown in Saudi Arabia according to the following system: 1) Fruit weight more than 15 gms. 2) Fruit weight from 10 to 15 gms. 3) Fruit weight less than 10 gms., according to this classification, "Medjool" cv. belongs to the first group, and cvs. "Sewy", "Khalas" and "Zahdi" belong to the second group, while "Sakai" cv. belongs to the third group. The obtained results goes in line with those found by Salem &Hamdy (1993) who found that under conditions of Upper Egypt fruit weight was 14.14 gms. for "Zahdi" and 12.22 gms for "Sewy" cv. However, Sayed (1999) under Minia region conditions, fruit weight of "Sewy" was ranged from 11.0 to 12.4 gms. and from 9.5 to 10.5 gms for "Zahdi".

With regards to fruit dimension data in the same Table reveal the same trends as observed on fruit weight, i.e. fruits of "Medjool" were longest and widest diameter (4.64 × 2.72 cms). "Sewy" ranked to second highest length (3.59 cms) but had the narrowest diameter (2.22 cms.). "Zahdi" and "Khalas" fruits ranked the third and fourth degree for both length and diameter (3.47 × 2.27 and 3.40 × 2.24 cms, respectively), while "Sakai" fruits were shortest in length (3.13cms) but ranked the second after "Medjool" in diameter (2.33cms). These results are generally in harmony with those reported by Hussein *et al.* (1976) on 18 date cvs. grown in Saudi Arabia, Salem &Hamdy (1993), Ahmed *et al.* (1996) and Sayed (1999) on some Saudi and Iraqi date palm cultivars, Gadall (2013) on some Arabian date palm cultivars including "Zahidi", "Madjool", "Khalas" and "Sakai" as well as "Sewy" as local cultivar.

Data also revealed that as an arrange of two seasons flesh % attained more than 90% of fruit weight in "Medjool" (93.18% as average of the two seasons) and "Sewy" (92.92%) fruits, while it was less than 80% in "Sakai" fruits (78.43%). Meanwhile flesh % was in between for "Zahdi" and "Khalas" cvs. (88.79 and 87.38%, respectively). Mougheith *et al.* (1976), Meligi *et al.* (1983) and Abdalla *et al.* (1995) reported that flesh % varies according to cultivar. The available literature in this concern was reported by Khan *et al.*, (2008) and Iqbal., *et al.*, (2011).

Fruit chemical properties:

Results presented in Table (5) indicated that there are significant differences in moisture content between the tested cvs. The average values of the two seasons show that moisture content of flesh was high in "Sakai" fruits (32.59%) followed in a descending order by shoes of "Madjool" (28.85), "Zahdi" (26.04%), and "Sewy" (24.90%) then by fruits of "Khalas" which attained the lowest moisture content (23.12%). These results are in line with those obtained by Gadalla (2013) on some Arabian and local date cultivars, who found that the moisture content of fruits was ranged from 21.45 to 32.90% according to cultivar, also, Hussein *et al.*, 1979 reported that moisture content in fruits of semi dry dates was ranged between 20 and 30%.

Total soluble solids (T.S.S)%:

Percentage of total soluble solids (T.S.S.) in the fruits significantly varied for the tested cultivars. Fruits of "Sakai" on the average attained the uppermost T.S.S.% (71.35%) against (50.30%) for "Zahdi" cv. The other tested cvs. including "Sewy" cv. showed intermediate T.S.S. percentage. These results are generally in harmony with those reported by Abdalla *et al.* (1995); Ahmed *et al.* (1996) and Sayed (1999) on some Saudi and Iraqi date palm cultivars.

Total sugars, reducing sugars and non-reducing sugars content:

As for total sugars, data in Table (5) reveal the same trends as observed for total soluble solids (T.S.S.), i.e. fruits of "Sakai" were had the highest content of total sugars (56.79% as average of the two seasons), descending followed by those of "Madjool" (55.44%) and "Sewy" (53.54%) fruits, in comparison with both "Khalas" and "Zahdi" fruits which had the lowest total sugars content (42.23 & 41.77%, respectively). Results showed also that most of these sugars were found as reducing sugars. "Madjool" fruits were highest in reducing sugars content (47.94%), followed by "Sewy" (40.53%), "Sakai" (39.10%) and "Khalas" (32.55%) fruits, while "Zahdi" fruits were lowest in this respect (29.54%). Data also showed that "Sakai" fruits came in the first rank between the tested cvs. in non-reducing sugars content (17.69%), followed by "Sewy", "Zahdi" and "Khalas" (13.01, 12.24 and 9.68%, respectively), while "Madjool" fruits had the lowest non-reducing sugars content (7.51%). Analogical results were reported by Hussein *et al.* (1976) on 18 date cvs. grown in Saudi Arabia, Habib *et al.* (1984) and Hussein *et al.* (1984) on some date palm cvs. grown in North and South Sina, Egypt, respectively. Also, Sayed (1999) on some Arabian date palm cvs. Including "Zahdi" and "Khalas" reported that there were significant variations in fruits content of total, reducing and non-reducing sugars among the date cultivars.

Tannins content:

The average of the two years showed insignificant differences in fruit tannins content between the tested cvs. In general fruits tannins content was low in "Sewy" fruits (0.16 %), high in "Zahdi" fruits (0.20 %) and intermediate in the rest of tested cvs. The results are in harmony with those obtained by Sayed (1999) who reported that fruits tannins content ranged from 0.100 % to 0.366 % in some Saudi and Iraqi cvs. Ahmed *et al.*, (1996) mentioned that total soluble tannins content in "Zahidi" fruits was 13.11 mg/100g. of fresh weight. Khan *et al.*, (2008) and Iqbal *et al.*, (2011) they reported that physio-chemical properties of fruits were affected by cultivar and surrounding conditions.

General evaluation and final conclusion:

The numerical evaluation of Arabian date palm cultivars (Table 6) showed that "Medjool" seemed to be the superiors cv. in yield and fruit quality, as it attained the uppermost score units (98.22 units of 100) due to receiving all the units specified for yield and ranked the first position for three of the concerned 7 fruit properties i.e. fruit weight, flesh percentage and fruit length and ranked the second position for fruit diameter, total soluble solids and total sugars content. In other words, "Medjool" cv. ranked first in total score units of yield (30/30) and fruit quality (68.22/70).

local cv. "Sewy" occupied the second situation (87.15units/100) as it ranked the second in total score of yield (28.28/30 units) and receiving all the units specified for tannins content and ranked the second position for three properties i.e. fruit weight and fruit length and flesh percentage, it also ranked third position for two properties i.e., total soluble solids and total sugars content. In other words, "Sewy" cv. ranked the second position in total score units for yield (28.28/30) and fruit quality (58.90/70). "Zahdi" cv. ranked in the third position in the general evaluation (79.01/100) its ranking the third in total score of yield (27.77/30 units), however it occupied the lowest position in fruit quality (51.24/70) among all the tested cvs., the properties that reduced the score of fruit quality of this cv. were TSS, total sugars content and the high tannins content of fruit as well as the relatively low fruit weight. In other words, "Zahdi" cv. seemed to be of great yield but fruit quality was less than that of the standard studied cultivar ("Sewy").

Table 4. Fruit physical properties of some Arabian and local date cultivars grown under condition of Menofia government during 2014 and 2015 seasons.

cultivars	Fruit weight			Fruit length			Fruit diameter			Flesh %		
	2014	2015	Av.	2014	2015	Av.	2014	2015	Av.	2014	2015	Av.
Zahdi	11.11	11.37	11.24	3.47	3.47	3.47	2.17	2.30	2.24	87.49	90.06	88.78
Sakai	7.37	7.47	7.42	3.13	3.13	3.13	2.22	2.45	2.33	79.38	77.51	78.44
Khalas	12.40	10.90	11.65	3.13	3.67	3.40	2.43	2.10	2.27	88.14	86.51	87.33
Medjool	21.67	26.73	24.20	4.57	4.70	4.64	2.63	2.80	2.72	92.62	93.64	93.13
Sewy	13.43	13.10	13.27	3.57	3.60	3.59	2.17	2.27	2.22	92.03	93.89	92.96
New L.S.D. at 0.05	1.75	2.19	1.97	0.37	0.34	0.36	0.23	0.28	0.26	1.71	1.49	1.60

Table 5. Fruit chemical properties of some Arabian and local date cultivars grown under condition of Menofia government during 2014 and 2015 seasons.

cultivars	Moisture content			T S S %			Total sugars content %			Reducing sugars content%			Non-Reducing sugars content%			Tannins content %		
	2014	2015	Av.	2014	2015	Av.	2014	2015	Av.	2014	2015	Av.	2014	2015	Av.	2014	2015	Av.
Zahdi	26.37	25.70	26.04	45.73	54.87	50.30	44.37	39.17	41.77	31.2	27.87	29.54	13.17	11.3	12.24	0.20	0.20	0.20
Sakai		31.97	32.59	72.47	70.23	71.35	58.47	55.1	56.79	39.05	39.15	39.10	19.42	15.96	17.69	0.19	0.15	0.17
Khalas	22.63	23.6	23.12	52.67	50.5	51.59	43.32	41.13	42.23	33.17	31.93	32.55	10.15	9.2	9.68	0.18	0.17	0.18
Medjool	29.3	28.4	28.85	66.17	64.3	65.24	56.28	54.6	55.44	48.47	47.4	47.94	7.81	7.2	7.51	0.18	0.17	0.18
Sewy	25.13	24.67	24.90	62.37	59.9	61.14	54.57	52.5	53.54	41.01	40.04	40.53	13.56	12.46	13.01	0.17	0.15	0.16
New L.S.D. at 0.05	1.72	1.78	1.75	3.84	3.62	3.73	1.52	1.66	1.59	1.68	1.77	1.73	1.01	1.2	1.11	N.S.	N.S.	N.S.

Table 6. Numerical of general evaluation of some Arabian and local date cultivars according to yield and fruit quality (average of two seasons).

Units Cultivars	Yield Per palm Units (30)	Fruit quality (70 units)							Total score of fruit quality (70)	General evaluation of palms (100)
		15	15	5	5	10	15	5		
		Fruit Weight	Flesh %	Fruit length	Fruit diameter	TSS	Total sugars	Tannins		
Zahdi	27.77	7.0	14.30	3.74	4.12	7.05	11.03	4.00	51.24	79.01
Sakgey	11.87	4.60	12.63	3.37	4.28	10.00	15.00	4.71	54.59	66.46
Khalas	15.99	7.22	14.07	3.66	4.17	7.23	11.15	4.44	51.94	67.93
Medjool	30.00	15.00	15.00	5.00	5.00	9.14	14.64	4.44	68.22	98.22
Sewy	28.28	8.23	14.97	3.87	4.09	8.57	14.14	5.0	58.87	87.15

"Khalas" cv. received 67.93 units/100 as general evaluation, it ranked the fourth in total score of yield (15.99/30 units) i.e. more than 75% of general score is mainly due to fruit quality (51.94 units), which was generally lower than of "Sewy" cv. (58.87), the properties that reduced the score of fruit quality of this cv. were the relatively low fruit weight, TSS, total sugars content and the relatively high tannins content of fruit.

"Sakai" cv. occupied the last position among the tested cvs. due to its receiving the least general evaluation (66.46units/100), due to receiving the least units specified for yield (11.87/30). This may be due to its lowest number of bunches / palm, fruit weight and fruit retention %. It is worth mention that, more than 80% of general evaluation score is mainly due to fruit quality (54.59 units). Fruits of "Sakai" cv. had the highest TSS, total sugars and lower tannins content among the tested cultivars.

Thus, one can conclude that "Medjool" and "Sewy" cvs. proved to be the superior cvs. in yield and fruit quality among all the tested cvs. However "Zahdi" cv. seemed to be of great yield but fruit quality was less than the standard studied cv. ("Sewy"). On the other hand, "Sakai" cv. showed less palm yield but fruit quality was reasonable for consumer, but it was generally lower than of "Sewy" cultivar.

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دراسة مقارنة لبعض أصناف نخيل البلح العربية النصف جافة النامية بمحافظة المنوفية

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أجري هذا البحث خلال الفترة من ٢٠١٤ الي ٢٠١٥ لدراسة مقارنة لبعض أصناف النخيل العربية النصف جافة وهي "المجدول" و"الزهدي" و"الصقعي" و"خلاص" بالمقارنة بالصنف "السيوي"(محلي نصف جاف) تحت ظروف محافظة المنوفية . تم دراسة ميعاد خروج وانشقاق أول وآخر أغريض و الذ سبة المثوية لعقد الثمار والثمار المتبقية عند الجمع وأي ضاً ميعاد الجمع وعدد السباطات والمحصول لكل نخلة وكذلك الصفات الطبيعية والكيمائية للثمار للأصناف المختبرة. وقد أظهرت النتائج أن خروج وانشقاق الأغريض كانت مبكرة في صنف "المجدول" و"الخلاص" يليها "السيوي" و"الزهدي" بينما كانت متأخرة في الصنف "الصقعي" وكان ميعاد جمع الثمار لجميع الأصناف المختبرة في الأسبوع الأول من أكتوبر.

وبالنسبة لمتوسط محصول النخلة حقق الصنف "المجدول" أعلى محصول بين الأصناف المختبرة يليه "السيوي" ثم "الزهدي" بينما كان أقل محصول في صنف "الصقعي" و"الخلاص". وقد أنتج نخيل "المجدول" أكبر عدد من السباطات/نخلة بينما كان نخيل "الصقعي" أنتج أقل عدد من السباطات.

أما نسبة عقد الثمار والثمار المتبقية عند الجمع ، أعطى الصنف "مدجول" أعلى قيم من نسبة العقد والثمار المتبقية في حين كان الصنف "خلاص" أقلهم في هذا الشأن.

وتفوقت ثمار الصنف "مدجول" في الوزن والأبعاد ونسبة اللحم لوزن الثمرة بينما ثمار "الصقعي" كانت أقلهم وأحتوت ثمار الصنف "الصقعي" أعلى محتوى من الرطوبة بينما ثمار الصنف "خلاص" أحتوت أقل نسبة رطوبة في حين تفوقت ثمار "الصقعي" و"المجدول" في محتواها من المواد الصلبة الكلية والسكريات الكلية. وأن محتوى الثمار من التانينات أختلفت فيما بين الأصناف المختبرة ولكن هذه الاختلافات لم تكن معنوية.

وطبقاً للنتائج قد أظهر التقييم العام للأصناف المختبرة من خلال المحصول والصفات الثمرية أن الصنف "مدجول" و"السيوي" تفوقا في المحصول والصفات الثمرية بينما الصنف "زهدي" أعطى محصول جيد ولكن ب صفات ثمرية أقل من ثمار "السيوي" بينما أحتل صنف "الصقعي" و"الخلاص" المركز الأخير في التقييم العام لحصولهم على أقل درجة في التقييم العام وفي المحصول بينما كانت الصفات الثمرية لثمار "الصقعي" مقبولة للمستهلك وأن كانت أقل من ثمار "السيوي".